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XI. *Abstract of a meteorological journal kept at Benares during the years 1824, 1825, and 1826. By JAMES PRINSEP, Esq. Assay Master of the mint at Benares. Communicated by PETER MARK ROGET, M.D. Secretary of the Royal Society.*

Read January 25, 1828.

THE three principal Tables, each of which comprises the abstract for one year of the meteorological journal at Benares, are followed by two others, numbered I. and II., presenting the mean daily oscillations of the barometer, and the monthly deviations from its average height, for each month during four successive years, accompanied by the corresponding variations of the thermometer from its mean. These tables exhibit the remarkable coincidence preserved by these phænomena throughout the year. The indications of the barometer are all reduced to the freezing point by DULONG and PETIT's formula for the dilatation of mercury. I have inserted in the first column of Table I. the mean of three years' observations made at Berhampoor by Dr. A. RUSSEL; but the instrument employed being of the mountain construction, the mercury did not move freely in the tube, which will account for the oscillations being uniformly less than those measured by myself. Mr. DANIELL has noticed the liability of barometers to deteriorate from the accumulation of air bubbles above the mercury: to obviate this cause of error, I made frequent comparisons with one of WOLLASTON's boiling thermometers. From October 1823 to August 1825, the error from this cause amounted to .046 inch, and I deemed it necessary to reboil the barometer; it then stood, as nearly as possible, correct once more. All of my tables have been cleared of the minute error thus found.

As a graphic representation more readily enables the eye to estimate the agreement of two lines in motion, I have delineated in a diagram the courses indicated by Table II., only reversing the direction of one curve, that the two lines may be collateral with respect to the centre line which stands for the annual mean. The scales at the sides will explain the formation of the curves. The year 1826 is omitted in the diagram, because the last two months are wanting in the series of observations.

Abstract of a Meteorological Journal: Benares, 1824.

Date.	Barometer.		Thermometer.			Wet Bulb Therm.*		Hair Hygro-meter.	Evapo-ration.	Rain.	Wind.	Weather.
	Obs.	Mean.	Interior.	Exterior.	Extremes.	Mean.	Diff. +0.8					
Jan. . .	9 A.M. 29.892 5½ P.M. 29.307	29.849	59.82 62.35	57.32 63.27	49.68 69.35	56.60	4.49	94.1	1.924	One shower.	W. and Calm.	Foggy: clear: change.
Feb. . .	10½ A.M. 29.786 5½ P.M. 29.688	29.737	66.40 70.12	68.16 67.74	55.40 76.52	61.34	7.20	83.7	3.220		W. and Calm.	Cirrocum. Hard winds.
March	10½ A.M. 29.752 6¼ P.M. 29.650	29.701	75.70 80.22	79.42 83.40	66.30 86.11	67.32	14.89	83.0	6.682	0.240	W.	Several gales.
April	10 A.M. 29.659 6½ P.M. 29.544	29.601	82.85 86.89	85.42 92.38	73.75 95.10	70.84	18.86	80.1	10.697	0.140	W.	Steady weather.
May. . .	10 A.M. 29.500 6¼ P.M. 29.385	29.442	88.59 92.05	95.12 99.66	80.97 103.70	74.38	23.81	83.2	13.044	0.400	N.W. E. Var.	Clear: then misty: then gale and violent storm. (Sultan- poor barracks blown down.)
June. . .	10¼ A.M. 29.387 6 P.M. 29.274	29.330	89.11 92.46	89.76 89.42	77.11 101.65	84.42	5.97	90.9	8.157	3.015	W. Var. E.	Little rain, but cloudy.
July . .	11 A.M. 29.322 5 P.M. 29.253	29.287	85.65 87.22	85.79 85.95	80.18 90.40	82.65	4.02	96.2	2.785	17.480	W. S.W. E.	Settled rain.
August	10 A.M. 29.402 5¼ P.M. 29.344	29.373	81.76 90.33	86.04 85.15	80.60 90.01	83.28	3.07	94.8	2.318	9.152	Calm. E. Var.	Fine towards the 15th.
Sept.	10½ A.M. 29.372 5½ P.M. 29.484	29.528	85.65 88.06	84.90 86.94	77.43 91.33	80.11	6.61	87.6	3.781	2.850	W. Var. E.	Showers: clear: cloudy.
Oct. . .	10½ A.M. 29.712 5½ P.M. 29.627	29.669	81.60 82.93	80.94 81.15	72.28 85.96	78.81	3.03	87.1	2.911	3.125	E. Calm. Var.	A gale from W: then clear: then squally.
Nov. . .	10½ A.M. 29.819 5 P.M. 29.729	29.774	74.36 76.37	72.11 73.78	59.68 78.50	66.89	6.85	81.0	2.925	0.500	Var. Calm.	Cleared up.
Dec. . .	10½ A.M. 29.873 5 P.M. 29.797	29.835	65.56 67.16	62.15 64.49	50.58 68.51	58.19	5.93	82.8	2.005	1.420	W. Var. S.E.	Clear and fine: gale on the 30th.
Annual Mean		29.593		79.71		79.99		87.04				
						77.50	72.07					

* This thermometer stands 0.8 deg. higher than the others; this quantity is therefore added to the column of differences.

Date.		Barometer.		Thermometer.				Wet Bulb Therm.			Hair Hygr.		Evapo- ration.	Rain.	Wind.	Weather.
		Obs.	Mean.	Interior.	Exterior.	Extremes.	Obs. ^{ns} .	Mean.	Diff. +0.8.	Obs. ^{ns} .	Mean.					
Jan. . .	10 ³ / ₄ A.M.	29.883		64.54	62.97	54.12	61.05	61.55	2.78	92.	90.5	1.826	4.095	Var. E. W. E.	Unseasonable strati- fogs: rain: storms: cumuli.	
	5 P.M.	29.797	66.15	64.09	68.14	62.06	62.06			89.						
Feb. . .	11 A.M.	29.803		67.88	67.11	56.98	63.08	63.39	7.02	85.	83.0	2.406	5.325	Var. W.	Clear: cirri. Seve- ral heavy storms: then clear.	
	4 ¹ / ₂ P.M.	29.732	70.02	72.11	73.07	63.70	63.70			81.						
March	10 ¹ / ₂ A.M.	29.785		74.53	74.22	63.68	66.00	65.51	11.38	83.	79.5	4.029	0.335	E. Var. SE. W.	Dull haze: violent storm: clear.	
	5 ¹ / ₂ P.M.	29.673	78.42	75.96	84.00	65.02	65.02			76.						
April. .	10 A.M.	29.661		85.29	88.05	75.11	73.93	72.61	18.11	79.2	76.6	12.669	0.025	Calm. W. SE. W.	Clear: cirrostrati: hard gale E. Changeable.	
	5 ³ / ₄ P.M.	29.550	86.39	91.90	100.20	71.30	71.30			74.						
May . .	10 A.M.	29.595		89.10	93.39	81.79	79.31	78.68	16.88	Broken and replaced by an accurate Hair Hygrometer.		16.864	.....	E. Var. E.	Clear: gale from N.
	6 P.M.	29.485	90.54	96.14	105.43	78.05	78.05									
June . .	10 A.M.	29.420		89.68	91.30	85.19	79.99	80.18	13.09			7.720	5.725	NE. W. NE. Calm.	Cloudy: hard gale E: showers.	
	6 ¹ / ₄ P.M.	29.311	90.32	93.65	97.93	80.38	80.38									
July . .	10 ³ / ₄ A.M.	29.404		87.03	85.82	81.82	82.29	82.47	4.69			4.447	11.050	E.	Heavy rain: cloudy.	
	6 ¹ / ₄ P.M.	29.317	88.64	86.91	89.58	82.65	82.65									
August	10 ¹ / ₂ A.M.	29.518		87.68	86.61	81.76	81.30	81.80	6.55			4.426	4.650	E. SW. E.	Hot and cloudy.	
	6 P.M.	29.425	89.92	88.50	90.34	82.30	82.30									
Sept... Sept... Oct. . .	10 ¹ / ₄ A.M.	29.581		85.13	83.85	79.95	80.57	80.43	4.86	94.1	88.4	2.657	9.020	Var.	Gale three days: cumuli: cum.- cirri: fair.	
	6 P.M.	29.468	86.79	85.13	87.43	80.29	80.29			82.3						
Oct. . .	10 ¹ / ₄ A.M.	29.702		81.13	80.05	74.68	74.74	75.38	6.29	84.8	83.2	3.003	6.130	S. Calm. W.	Rain and gale: dry weather: clear.	
	5 ¹ / ₂ P.M.	29.615	83.35	81.69	84.41	76.03	76.03			81.6						
Nov... Nov... Dec... Average.....	10 ³ / ₄ A.M.	29.829		72.59	69.84	62.29	64.73	64.91	7.20	80.5	76.8	3.168	0.550	W. Gentle. W.	Cloudless sky to the 18th: then showers.	
	5 ¹ / ₂ P.M.	29.718	75.48	72.78	75.63	65.09	65.09			73.2						
Dec... Average.....	10 ¹ / ₂ A.M.	29.868		65.15	61.34	53.02	55.45	56.74	7.63	76.2	74.7	3.852	.....	W. Regular.	Dry and colder than usual.
	5 ¹ / ₂ P.M.	29.766	68.10	65.80	68.47	58.03	58.03			73.2						
		.....		80.16	79.96	78.12		71.97							
		29.620														

Abstract of a Meteorological Journal; Benares, 1826.

Date.	Barometer.		Thermometer.				Wet Bulb Therm.		Hair Hygr.		Evapo- ration.	Rain.	Wind.	Weather.
	Obs.	Mean.	Interior.	Exterior.	Extremes.	Obs.	Mean.	Diff. +0.8.	Obs.	Mean.				
Jan. . . 10 $\frac{1}{2}$ A.M. 5 $\frac{1}{2}$ P.M.	29.835 29.740	29.787	64.85 63.91	61.34 66.45	53.57 69.72	53.60 57.86	55.73	8.9	73.4 69.8	71.6	Inches. 3.138	Inches. 0.150	W. E. Calm.	Clear and cold: one storm.
Feb. . . 10 $\frac{1}{2}$ A.M. 5 $\frac{1}{2}$ P.M.	29.737 29.641	29.689	71.38 73.38	67.62 72.64	57.81 76.64	57.89 57.85	57.87	13.0	59.6 52.4	56.0	3.928	....	W. Calm.	Steady: clear.
March 10 $\frac{1}{2}$ A.M. 5 $\frac{1}{2}$ P.M.	29.751 29.645	29.698	77.14 82.65	77.98 83.59	67.91 86.55	63.75 64.72	64.23	17.3	62.4 54.2	58.1	9.853	0.410	Var. E.&W.	Very dry on 31st.
April.. 10 A.M. 6 P.M.	29.625 29.492	29.558	83.85 85.54	87.31 92.52	78.41 98.31	67.23 68.43	67.83	22.9	61.1 60.5	60.8	16.739	....	W.	Steady hot wind.
May .. 9 $\frac{1}{2}$ A.M. 6 P.M.	29.575 29.438	29.506	88.18 89.87	87.98 93.83	81.84 99.82	73.45 72.98	73.21	18.9	73.4 66.6	70.0	13.589	0.180	Calm. W. E. Var.	Several storms:) eclipsed 21st.
June.. 9 $\frac{1}{2}$ A.M. 6 $\frac{1}{4}$ P.M.	29.406 29.304	29.355	88.64 91.18	87.72 89.85	85.66 93.56	80.40 80.17	80.29	9.2	84.9 79.6	72.2	7.559	1.885	E. Var.	Changeable: one gale.
July .. 9 $\frac{1}{2}$ A.M. 6 P.M.	29.325 29.263	29.294	86.74 87.43	84.42 85.36	80.70 87.64	81.69 81.55	81.62	4.1	91.6 89.2	90.4	3.980	25.730	Var. E. W.	Heavy rain.
Aug... 10 A.M. 6 P.M.	29.470 29.391	29.431	85.28 86.24	83.99 84.15	80.04 86.35	81.91 81.64	81.77	3.0	93.0 91.9	92.4	3.314	11.720	Very Var.	Cloudy and showery.
Sept.. 10 $\frac{1}{2}$ A.M. 6 P.M.	29.549 29.456	29.502	86.56 87.86	85.22 86.29	79.86 89.01	80.28 79.59	79.93	6.4	84.8 81.8	83.3	7.010	4.270	E. W.	Set in fine on the 16th.
Oct. . . 10 A.M. 6 P.M.	29.757 29.660	29.708	83.93 86.27	81.19 83.94	73.96 87.18	72.87 73.03	72.95	10.4	78.3 70.2	74.2	8.000	0.100	W. E. W.	Clear and fine: one squall 14th.

TABLE I. Daily Oscillations.

Month.	Barometer.					Thermometer.				
	3 Years by Dr. RUSSEL.	1824.	1825.	1826.	Mean of 3 last.	1823.	1824.	1825.	1826.	Mean.
January.....	Inch. .073	Inch. .092	Inch. .091	Inch. .109	.097	21.5	19.7	14.0	16.1	17.8
February .....	.098	.109	.096	.103	.103	21.0	21.1	16.1	18.8	19.2
March .....	.098	.117	.124	.122	.121	24.0	19.8	20.3	18.6	20.7
April .....	.103	.127	.113	.135	.125	26.5	21.3	25.1	19.9	23.2
May .....	.103	.120	.113	.140	.124	23.4	22.7	23.6	18.0	21.9
June .....	.084	.119	.111	.109	.113	20.3	24.5	11.7*	7.9	16.1
July .....	.062	.071	.091	.070	.077	9.3	10.2	7.7	6.9	9.0
August .....	.068	.084	.099	.082	.088	8.9	9.4	8.6	6.3	8.3
September.....	.070	.094	.117	.098	.103	9.5	13.9	8.5	9.2	10.3
October .....	.070	.103	.094	.102	.100	16.0	13.7	9.7	13.2	18.1
November .....	.070	.095	.120	—	.107	18.4	18.8	13.3	—	16.8
December .....	.075	.085	.111	—	.098	15.7	17.9	15.4	—	16.3

* From this month the Register Thermometer stood in a new house much less exposed than before;—the ranges are consequently much smaller.

TABLE II. Monthly Deviations.

Month.	Barometer at 32°.					Thermometer (mean of extremes.)				
	1823.	1824.	1825.	1826.	Mean.	1823.	1824.	1825.	1826.	Mean.
January.....	+.285	+.299	+.277	+.232	+.273	-16.7	-18.0	-17.0	-16.5	-17.0
February	+.233	+.165	+.184	+.119	+.175	-10.7	-11.5	-13.1	-10.9	-11.5
March	+.095	+.106	+.124	+.104	+.107	+ 0.5	- 1.3	- 4.3	- 0.9	- 1.5
April	-.083	-.016	-.027	-.048	-.043	+11.2	+ 6.9	+ 9.5	+10.3	+ 9.5
May	-.137	-.192	-.104	-.113	-.136	+12.7	+14.8	+15.5	+12.7	+13.9
June	-.307	-.304	-.278	-.267	-.289	+15.7	+11.9	+13.4	+11.5	+13.1
July	-.311	-.327	-.277	-.318	-.308	+ 6.1	+ 7.8	+ 7.6	+ 6.1	+ 6.9
August	-.227	-.242	-.168	-.175	-.203	+ 5.0	+ 7.8	+ 7.9	+ 5.1	+ 6.4
September.....	-.130	-.041	-.108	-.111	-.098	+ 4.5	+ 6.9	+ 5.6	+ 6.3	+ 5.8
October.....	+.084	+.066	+.036	+.099	+.074	- 0.1	+ 1.6	+ 1.4	+ 2.5	+ 1.3
November	+.169	+.201	+.175	—	+.181	-11.3	- 8.5	- 9.2	—	- 9.7
December	+.309	+.290	+.240	—	+.279	-17.0	-18.5	-17.4	—	-17.6

Mean Barometric Alt. 29°.468.

Mean Thermometric Alt. 77°.81.